

## APPENDIX D

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### Revised Communications Problem Screening and Investigation Tools

One of the final activities of this study was to develop a set of tools that IOs could use to investigate casualties resulting from communications problems. The objective of this activity was to develop two tools. The first tool was to be a streamlined, one-page form that IOs could use to determine whether a given casualty appears to have a communications cause. The second tool was to be a more extensive form, or set of forms, that would aid IOs in collecting information that could be used to specify causal links explaining “why” the casualty occurred. This appendix presents the proposed tools resulting from efforts to meet this objective.

After completing the data analyses and interpreting the study findings, we considered the most appropriate content and format for this set of tools. Three principles guided our development efforts, as summarized below.

1. The results clearly indicated that the set of five screening questions used in the study were effective in identifying casualties resulting from a communications problem – 76 percent of all casualties identified as requiring effective communications subsequently were determined to have resulted from a communications problem. Therefore, these five questions could provide the basis for the initial screening of cases.
2. The five communications sub-topic forms used in the study (vessel-vessel, bridge-pilot, vessel-shore authority, crew-crew, and vessel-shore worker) each had one unique section that requested consideration of specific communications causes. This section was useful in focusing investigators’ attention on specific communications issues. It was determined that these sections should be incorporated into the screening procedure.
3. Most of the content of the five communications sub-topic forms was redundant across forms. A single page specified communications processes, problems, and contributing factors for investigators to consider and report during their investigation. This structure proved to be highly useful in identifying the particular problems and contributing factors of communications problems within and across the five communications sub-topics. Therefore, it was determined that this content and format should be largely retained in the final set of tools.

In developing our proposed investigation tools, we found that a one-page screening form and a one-page “in-depth” form that were basically self-contained met our objectives. Because each of these forms is one page, we thought it would be convenient if the two forms were printed front-to-back on the same sheet of paper.

After completing the forms, we determined that it would be best to introduce investigators to the general model that was used as the basis for the procedures, to provide some empirical support for the use of the procedures, and to give an easy-to-follow summary of the investigation steps. Therefore, we prepared a set of instructions intended to accompany the forms.

The completed forms were sent to selected MSOs for their review and comment. The forms were judged to be clear and easy to follow. However, our initial set of instructions was judged to be “too long and wordy.” In accordance with MSO input, we decreased the length and verbosity of our instructions.

Following are the proposed instructions and forms.

## Instructions for Investigating Communications Problems in Marine Casualties

These instructions provide an aid in using the *Communications Problems Screening and Investigation Procedures* to investigate communications problems in vessel and personnel injury casualties.

### Background

These procedures were developed as part of a Coast Guard study of how best to investigate and report on communications problems. As part of that study, a general model of communications problems was developed, shown in the adjacent figure. This model divides communications into four *Communications Processes* (prepare and send message, message transmission, receive and interpret message, and act on message) and four corresponding *Communications Problem Areas*. The model further identifies seven *Contributing Factor Areas* that can cause or contribute to communications problems.

### Basis

Investigation procedures based on this model were developed and then applied by Investigating Officers as part of the study. During the study, investigators screened casualties to identify those that required effective communications to support safe operations. Of those casualties identified as requiring effective communications, 76 percent were subsequently found to have a communications problem that contributed to the casualty. Following their initial screening of cases, investigators conducted in-depth investigations and analyses of selected casualties to identify specific communications problems and contributing factors. Investigating Officers were able to use the procedures to reliably identify communications problem areas and specific factors contributing to the casualties. Overall, the study found that 18 percent of critical vessel casualties and 28 percent of critical personnel injuries had a communications problem that contributed to the casualty.

### Instructions

The present procedures have been developed on the basis of the research study outlined above. Step 1 is conducted to identify if there was a potential for a communications problem to have contributed to the casualty. This step identifies casualties where there is a 76 percent probability that ineffective, inappropriate, or a lack of communications contributed to the casualty, according to the results of the research study.

**Step 1:** Review the five conditions, check any that apply, and identify the type(s) of communications that should be further analyzed (vessel-vessel, bridge-pilot, vessel-shore authority, crew-crew, and vessel-shore worker).

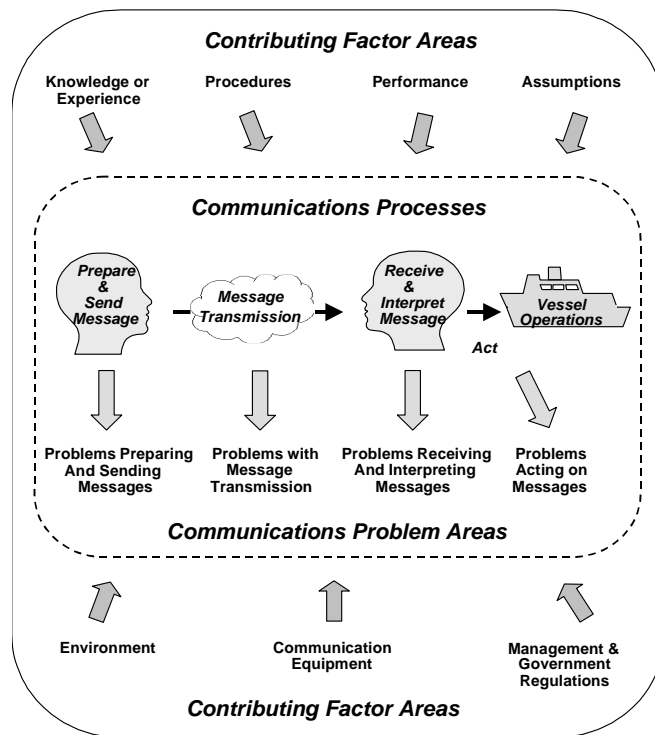
The remaining steps call for a further investigation of the specific communications causes that contributed to the casualty. Complete Step 2 to identify the specific communications causes, if any. Complete Step 3 to document your conclusions regarding the type of communications that contributed to the casualty.

**Step 2:** For each communication type identified in Step 1, consider the actions in which ineffective, inappropriate, or a lack of needed communications could have contributed to the casualty.

**Step 3:** Check the types of communications that likely contributed to this casualty and complete Step 4 for each type checked.

Use Step 4 as an aid in investigating and reporting any communication types identified in Step 3.

**Step 4:** For this step, it will typically be necessary to contact individuals involved in the casualty to determine the events leading up to the casualty, specific communications problems that occurred, and the factors that contributed to these problems. When the investigation and Step 4 have been completed, the results of your investigation and analysis can be incorporated into your MCDD, MCNS, and MCHF.



## Communications Problem Screening and Investigation Procedures

Please refer to the **Instructions for Investigating Communications Problems in Marine Casualties** for a summary of the background and basis for these procedures, as well as general instructions for their use.

### Step 1: Was there a potential for a communications problem contributing to the casualty?

Review the following casualty conditions, check ☒ all that apply, and note the corresponding communication type(s) for further review in Step 2. If no conditions apply, communications were likely not required in the situation.

Casualty Condition	Communication Type
<input type="checkbox"/> Two or more vessels were involved in this casualty.	Vessel-Vessel
<input type="checkbox"/> There was a pilot (other than a member of the vessel's crew) responsible for navigation of the ship.	Bridge-Pilot
<input type="checkbox"/> The vessel was navigating in an area under the supervision of a VTS operator, a bridge tender, a lockmaster, or a light operator.	Vessel-Shore Authority
<input type="checkbox"/> Two or more crewmembers who were directly involved in this casualty were working together, or this casualty could have been prevented if someone had shared additional information with another crewmember.	Crew-Crew
<input type="checkbox"/> The casualty occurred during coordination of activities between the vessel and shore-based personnel (e.g., dock worker, crane operator, or vessel agent).	Vessel-Shore Workers

### Step 2: What specific communications actions contributed to the casualty?

Check ☒ all actions in which ineffective, inappropriate, or a lack of needed communications may have contributed to the casualty. Note any other causes not listed. If any potential causes are identified, continue with Steps 3 and 4.

<b>Vessel-Vessel Communication Problems</b>	
<input type="checkbox"/> Vessel communication using a VHF radio system	<input type="checkbox"/> Vessel communication using visual signals
<input type="checkbox"/> Vessel communication using sound signals	<input type="checkbox"/> Vessel communication using some other means
<input type="checkbox"/> Other:	
<b>Bridge-Pilot Communication Problems</b>	
<input type="checkbox"/> Pilot request for vessel and situation information	<input type="checkbox"/> Pilot brief to bridge crew on operating conditions
<input type="checkbox"/> Bridge crew warned pilot of equipment malfunction	<input type="checkbox"/> Pilot update to bridge crew on change in plans
<input type="checkbox"/> Pilot brief to bridge crew on navigation plan	<input type="checkbox"/> Crew update to pilot of change in situation
<input type="checkbox"/> Other:	
<b>Vessel-Shore Authority Communication Problems</b>	
<input type="checkbox"/> Vessel call to shore authority	<input type="checkbox"/> Vessel statement of intentions to shore authority
<input type="checkbox"/> Shore authority advisory to vessel of situation	<input type="checkbox"/> Shore authority acknowledgement of vsl intentions
<input type="checkbox"/> Other:	
<b>Crew-Crew Communication Problems</b>	
<input type="checkbox"/> Use of direct and verbal conversation	<input type="checkbox"/> Use of communications devices
<input type="checkbox"/> Use of hand signals	<input type="checkbox"/> Use of written communications
<input type="checkbox"/> Other:	
<b>Vessel-Shore Worker Communication Problems</b>	
<input type="checkbox"/> Use of direct and verbal conversation	<input type="checkbox"/> Use of communications devices
<input type="checkbox"/> Use of hand signals	<input type="checkbox"/> Use of written communications
<input type="checkbox"/> Other:	
<b>No Potential Communication Problems Identified</b>	
<input type="checkbox"/> Further investigation failed to support communications as a causal factor	

### Step 3: Which of the following types of communication contributed to this casualty?

Based on the response to Step 2, check ☒ the types of communication, if any, that likely contributed to this casualty and complete Step 4 for each type checked.

<input type="checkbox"/> Vessel-Vessel Communications	<input type="checkbox"/> Crew-Crew Communications
<input type="checkbox"/> Bridge-Pilot Communications	<input type="checkbox"/> Vessel-Shore Worker Communications
<input type="checkbox"/> Vessel-Shore Authority Communications	<input type="checkbox"/> N/A--no communication problems identified

(Continue on reverse)

#### Step 4: What specific communications problems and factors contributed to this casualty?

For each type of communication checked in Step 3, check ☒ all communications problems that contributed to the casualty. For each problem identified below, list at least one contributing factor from the list below by indicating its corresponding identification number (#1-41). For example, ☒ Did not request information...3, 15, 28.

Communications Process	Communications Problem	Contributing Factor (see 1 – 41 below)		
Prepare & Send Message (includes spoken and written communications, hand and sound signals)	<input type="checkbox"/> Did not communicate .....	— — —		
	<input type="checkbox"/> Communicated ambiguous, incorrect, or incomplete information .....	— — —		
	<input type="checkbox"/> Did not question others' actions or assert own interpretation of situation .....	— — —		
	<input type="checkbox"/> Did not request information .....	— — —		
	<input type="checkbox"/> Did not send information in a timely manner .....	— — —		
	<input type="checkbox"/> Sent different information than intended.....	— — —		
Message Transmission	<input type="checkbox"/> Message was not transmitted .....	— — —		
	<input type="checkbox"/> Message was interrupted .....	— — —		
	<input type="checkbox"/> Message was incomprehensible .....	— — —		
Receive & Interpret Message	<input type="checkbox"/> Did not monitor communications .....	— — —		
	<input type="checkbox"/> Did not listen to complete message .....	— — —		
	<input type="checkbox"/> Did not acknowledge information reception .....	— — —		
	<input type="checkbox"/> Did not interpret the information correctly .....	— — —		
	<input type="checkbox"/> Did not verify the validity or accuracy of the information.....	— — —		
Act on Message	<input type="checkbox"/> Took no action .....	— — —		
	<input type="checkbox"/> Action was not in accordance with agreement .....	— — —		
Others:		— — —		
<table border="0"> <tr> <td style="vertical-align: top;"> <p><u>Knowledge or Experience</u></p> <ol style="list-style-type: none"> <li>Improper use of signaling techniques (hand, light, flag)</li> <li>Improper use of standard marine technical vocabulary</li> <li>Inadequate knowledge of company procedures or policies</li> <li>Inadequate knowledge of correct communications protocol</li> <li>Inadequate knowledge of regulatory requirements</li> <li>Limited English skills or knowledge</li> <li>Language difficulty (e.g., enunciation, strong accent)</li> <li>Lack of common language</li> <li>Other: _____</li> </ol> <p><u>Procedures</u></p> <ol style="list-style-type: none"> <li>Did not carry communications equipment on person</li> <li>Did not operate the communications equipment correctly</li> <li>Selected incorrect communications channel or frequency</li> <li>Selected incorrect communications device</li> <li>Other: _____</li> </ol> <p><u>Performance</u></p> <ol style="list-style-type: none"> <li>Distracted or interrupted by other tasks (e.g., high workload)</li> <li>Forgot information or intended actions</li> <li>Tired or sleepy</li> <li>Individual not at work station</li> <li>Not willing to challenge authority</li> <li>Not willing to communicate</li> <li>Other: _____</li> </ol> </td> <td style="vertical-align: top;"> <p><u>Assumptions</u></p> <ol style="list-style-type: none"> <li>Assumed that there was no need to communicate</li> <li>Assumed lack of response as implicit (silent) confirmation</li> <li>Assumed incorrectly that other party knew the information</li> <li>Assumed that individual in charge recognized the problem</li> <li>Confusion regarding who was communicating</li> <li>Confusion regarding who was in charge of situation</li> <li>Incorrect interpretation of the situation</li> <li>Other: _____</li> </ol> <p><u>Environment</u></p> <ol style="list-style-type: none"> <li>Excessive ambient noise</li> <li>Excessive electronic or atmospheric disruption of signal</li> <li>Excessive traffic (i.e., too many users, too lengthy) on the assigned communications channel</li> <li>Other: _____</li> </ol> <p><u>Communications Equipment</u></p> <ol style="list-style-type: none"> <li>Communications equipment malfunction</li> <li>Communications equipment not available</li> <li>Communications equipment turned off</li> <li>Other: _____</li> </ol> <p><u>Management and Government Regulations</u></p> <ol style="list-style-type: none"> <li>No regulatory requirement to communicate</li> <li>Not part of individual's job description or responsibilities</li> <li>Inadequate Standard Operating Procedures</li> <li>Other: _____</li> </ol> </td> </tr> </table>			<p><u>Knowledge or Experience</u></p> <ol style="list-style-type: none"> <li>Improper use of signaling techniques (hand, light, flag)</li> <li>Improper use of standard marine technical vocabulary</li> <li>Inadequate knowledge of company procedures or policies</li> <li>Inadequate knowledge of correct communications 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